

## **REMARKS**

Further and favorable reconsideration is respectfully requested in view of the foregoing amendments and following remarks.

### **Claim Amendments**

Claims 34 and 35 have been amended to employ “consisting essentially of” language. Additionally, new claims 51 and 52 have been added to recite that the solidifying process occurs at about 25°C. Support for these amendments can be found on page 8, lines 9-11 of the present specification.

### **Patentability Arguments**

The patentability of the present invention over the disclosures of the references relied upon by the Examiner in rejecting the claims will be apparent upon consideration of the following remarks.

#### **Rejections Under 35 U.S.C. § 103(a)**

Claims 34, 35, 37, 38, 40-42 and 47-49 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Winter et al. (US 4,010,233) in view of Johnson (US 4,904,424).

Claim 50 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Winter et al. in view of Johnson, as applied to claim 34 above, and further in view of Thompson (US 3,291,753).

These rejections are respectfully traversed.

#### **The Position of the Examiner**

The Examiner takes the position that Winter et al. disclose a method of preparing a porous metal oxide fibers (where metal oxide fibers are equated to rod-shaped crystals of metal or metal oxide) material into a woven fabric, felt, mat or filter, suitable for use as catalyst support. The Examiner asserts that such porous catalyst support material containing fibers is equivalent to rod-shaped, open framework, sponge-like material. The Examiner further states that Winter et al. disclose preparing an aqueous viscous solution of water-soluble metal salt and

organic solvent such as polysaccharides, starch, dextrin, polyvinyl alcohols, etc., and allowing the solution to self-solidify to form a solid and baking the solid.

The Examiner admits that **Winter et al. fail to disclose dextran.**

The Examiner relies on Johnson as *allegedly* remedying this deficiency. Specifically, the Examiner states that Johnson is also drawn to making inorganic material including fibers, discloses preparing powdery metal alloy solution with a carbonaceous polymer, and similar to Winter et al., teaches spinning the dispersion solution into fibers and then heating the fibers to form final product. The Examiner asserts that Johnson teaches polyvinyl alcohol, starch, dextran, polyvinyl acetate as suitable carbonaceous materials. The Examiner contends that such solvents are substantially similar to that taught by Winter et al. (polyvinyl alcohol, starch, dextrin).

Thus, the position of the Examiner is that one of ordinary skill in the art would appreciate that the organic solvents of Winter et al. and Johnson are substitutes, as they comprise many of the same compounds, and serve substantially the same purpose. The Examiner contends that it would have been obvious to a person of ordinary skill in the art at the time of the invention to prepare an aqueous solution of a metal-salt and dextran in the method of Winter et al. since the use of dextran would have yielded predictable result of forming the fiber material.

Regarding claim 50, the Examiner admits that **Winter et al. and Johnson fail to disclose the metal element of the metal salt being selected from noble metals.** The Examiner contends that such a limitation is well known in the art. The Examiner points to Thompson as teaching noble metal salts, such as platinum salt and gold salt. The Examiner asserts that one of ordinary skill in the art, reading Winter et al. as a whole, would appreciate that Winter et al. is not particularly concerned with a specific metal salt, and discloses a wide variety of metals salts. Thus, the Examiner contends that it would have been obvious to a person of ordinary skill in the art at the time of the invention to incorporate a noble metal salt of Thompson in the solution of Winter et al., in order to form a desired catalyst system for a targeted application.

Applicants' Arguments

Applicants respectfully traverse the rejections.

Initially, as admitted by the Examiner, Winter et al. fail to teach or suggest dextran.

The position of the Examiner is that one of ordinary skill in the art would appreciate that the organic solvents of Winter et al. and Johnson are substitutes. However, as explained in MPEP 2143, in order for this rationale to be a proper basis for obviousness, there must be a finding that one of ordinary skill in the art would have substituted one known element for another, and that the results of the substitution would be been predictable. Although the Examiner has made a general allegation that the substitution would provide predictable results, the Examiner has not provided any support for his assertion. Furthermore, Applicants provide evidence that the presently claimed method has unexpected, and thus, unpredictable results.

Additionally, most of the Examples of Winter et al. employ  $\text{Al}_2\text{O}_3$  as a starting material. This compound is in solid particulate form, and is clearly distinct from the recited water-soluble metal salt of Applicants' claims.

Furthermore, a notable amount of carbon remains in the product of Winter et al. as the disperse phase, due to the starting metal species, even if the heating treatment is carried out. In Johnson, a carbon structure (carbide) is formed due to the use of particles as starting material, as well as its metal species. On the other hand, in the process of the presently claimed invention where dextran is used, carbon does not remain in the product, and an essentially pure metal or metal oxide material can be produced. This is demonstrated by the Examples in Applicants' specification. In Applicants' method, carbon does not react with the noble metal, such as gold or silver, as evidenced by the X- ray diffraction analyses shown in the Figures of the specification.

Additionally, as discussed above, Applicants have amended independent claims 34 and 35 to recite that the resulting metal or metal oxide porous material consists essentially of rod-shaped crystals of a metal or metal oxide. As the Examiner is aware, "consisting essentially of" language limits the scope of the claim to the specified materials or steps and those that do not materially affect the basic and novel characteristics of the claimed invention. See MPEP 2111.03 and *In re Hertz*, 537 F.2d 549, 551-52, 190 USPQ 461, 463 (CCPA 1976).

In this case, the inclusion of carbon in the resulting product would materially affect the basic and novel characteristics of the claimed invention, because a pure metal product is desired.

Pure metal products are useful for their physical and chemical properties in a variety of fields, and impurities are not preferred. Accordingly, a product resulting from Applicants' claimed method, wherein carbon is excluded, is clearly distinct from the products made by the methods of the prior art, which contain carbon.

Further, the processes of both Winter et al. and Johnson conduct a pretreatment of spinning to form fiber typically at an elevated temperature, before calcination at high temperature. This process would not be suitable for the presently claimed invention, and is quite distinct from Applicants' process. Specifically, Applicants' specification discloses a molding in a mold at a room temperature of 25°C as a typical case. Please see new claims 51 and 52.

Additionally, as discussed by the Examiner, Winter et al. disclose a method of preparing metal oxide fibers. The Examiner takes the unsupported position that the fibers of Winter et al. are equated to rod-shaped crystals of metal or metal oxide, as required by Applicants' claims. However, Applicants respectfully assert that this alleged correlation is inappropriate. In fact, the bulk "fiber" structure taught in the cited references is not suitable for forming a fine sponge-like material, as required by Applicants' claims. Please see the SEM micrographs in the Figures of Applicants' specification, which clearly demonstrate the specific microporous structure, i.e., "rod-shaped crystals," as required by Applicants' claims.

Turning to Johnson, the Examiner has pointed out that the reference teaches dextran. However, Applicants note that the method of Johnson is not directed at preparing a metal or metal oxide material, but rather, a ceramic alloy fiber. Furthermore, the starting material is not water-soluble metal salt but solid particulate.

The Examiner's position regarding the noble metals is that the substitution of a noble metal of Thompson for the metals of Winter et al. would have been obvious. However, Applicants kindly assert that this position can only be based upon hindsight, as there is absolutely no teaching or suggestion in Winter et al. to employ a noble metal. Furthermore, the field of the Thompson reference is quite distinct from the field of Applicants' invention. It is evident that the Examiner has located a reference discussing noble metals, and presented an obviousness rejection based on the substitution rationale. However, Applicants respectfully assert that this rejection is incomplete, as there is no evidence that (1) one of ordinary skill in the

art would make such a substitution, or (2) that such a substitution would result in predictable results, as required by MPEP 2143.

For the reasons set forth above, it is evident that the cited combinations of references fail to teach or suggest the specific combination of employing dextran and water-soluble [noble] metal salt(s), to form a metal or metal oxide porous material consisting essentially of rod-shaped crystals of a metal or metal oxide, wherein carbon does not react with the metal species.

For these reasons, the invention of claims 34, 35, 37, 38, 40-42, 47-50 and new claims 51 and 52 are clearly patentable over the cited prior art.

**Conclusion**

Therefore, in view of the foregoing amendments and remarks, it is submitted that each of the grounds of rejection set forth by the Examiner has been overcome, and that the application is in condition for allowance. Such allowance is solicited.

If, after reviewing this Amendment, the Examiner feels there are any issues remaining which must be resolved before the application can be passed to issue, the Examiner is respectfully requested to contact the undersigned by telephone in order to resolve such issues.

Respectfully submitted,

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April 23, 2010